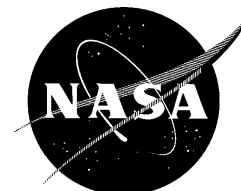# Standard Payload Integration Agreement for Small Pressurized Payloads

International Space Station Program

Baseline

January 2002

National Aeronautics and Space Administration
International Space Station Program
Johnson Space Center
Houston, Texas

REVISION AND HISTORY PAGE

REV.	DESCRIPTION	PUB. DATE
-	Initial Release (Reference per SSCD 006229, EFF. 02-27-02)	03-11-02

INTERNATIONAL SPACE STATION PROGRAM

STANDARD PAYLOAD INTEGRATION AGREEMENT
FOR SMALL PRESSURIZED PAYLOADS

CHANGE SHEET

March 14, 2002

<u>Baseline</u>

Space Station Control Board Directive 006229/(1-1), dated 02-27-02. (1)

<u>CHANGE INSTRUCTIONS</u>

SSP 57063, Standard Payload Integration Agreement for Small Pressurized Payloads, has been baselined by the authority of SSCD 006229. All future updates to this document will be identified on this change sheet.

INTERNATIONAL SPACE STATION PROGRAM

STANDARD PAYLOAD INTEGRATION AGREEMENT
FOR SMALL PRESSURIZED PAYLOADS

Baseline (Reference SSCD 006229, dated 02-27-02)

LIST OF EFFECTIVE PAGES

March 14, 2002

The current status of all pages in this document is as shown below:

Page	Change No.	SSCD No.	Date
i - vii	Baseline	006229	February 27, 2002
1-1 - 1-5	Baseline	006229	February 27, 2002
2-1 - 2-5	Baseline	006229	February 27, 2002
3-1	Baseline	006229	February 27, 2002
4-1 - 4-2	Baseline	006229	February 27, 2002
5-1 - 5-2	Baseline	006229	February 27, 2002
6-1 - 6-4	Baseline	006229	February 27, 2002
7-1 - 7-4	Baseline	006229	February 27, 2002
8-1	Baseline	006229	February 27, 2002
A-1 - A-4	Baseline	006229	February 27, 2002
B-1 - B-2	Baseline	006229	February 27, 2002

INTERNATIONAL SPACE STATION PROGRAM

**STANDARD PAYLOAD INTEGRATION AGREEMENT
FOR SMALL PRESSURIZED PAYLOADS**

JANUARY 2002

FOREWORD

INTERNATIONAL SPACE STATION PROGRAM

STANDARD PAYLOAD INTEGRATION AGREEMENT
FOR SMALL PRESSURIZED PAYLOADS

SSP 57063, Standard Payload Integration Agreement for Small Pressurized Payloads, establishes the requirements for International Space Station (ISS) small pressurized payloads.

The Payload Developer (PD) and the Payload Integration Manager (PIM) or International Partner (IP) equivalent will use this document as the requirements basis for the development of the unique Payload Integration Agreement (PIA) for Small Payloads. The template for the unique PIA is contained in SSP 57064, Payload Integration Agreement Blank Book for Small Pressurized Payloads **<TBD 2-1>**. Use of the standard template provides a consistent definition of the required integration agreements for the payload organization and the ISS Program.

Integration efforts for small payloads will be conducted and managed by the ISS Program Payloads Office utilizing a Small Payloads Integration Team. This team typically will consist of the PIM, the Operations Integration Lead and the Engineering Integration Lead. The PIM manages the PIA development and is responsible for maintaining the top level program agreements with the PD in addition to managing the overall integration schedule (PIM schedule). The Operations Integration Lead is responsible for documenting the PD's training, planning, operations, and ground support requirements. The Engineering Integration Lead is responsible for documenting the PD's requirements for configuration, Kennedy Space Center (KSC) technical and support requirements, and for obtaining engineering analysis, verification, and safety data. The Small Payloads Integration Team will work with the PD to define payload-specific requirements. The team will also obtain pertinent data to assure documentation in appropriate ISS Program databases, and disseminate information to implementing organizations. The Payloads Office will staff the Small Payloads Integration Team based upon the actual needs of the PD.

All commitments and services to be furnished by the ISS Program to the PD shall be furnished using its best efforts.
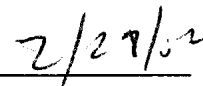
This Standard Payload Integration Agreement (SPIA) is consistent with the processes and products to be prepared by the ISS Program participants as specified in SSP 50200-01, Station Program Implementation Plan, Volume 1: Station Program Management Plan. This document is under Configuration Management (CM) control of the ISS Program Payloads Control Board (PCB) and any changes or revisions will be reviewed and approved by the PCB.

FOREWORD

INTERNATIONAL SPACE STATION PROGRAM

STANDARD PAYLOAD INTEGRATION AGREEMENT
FOR SMALL PRESSURIZED PAYLOADS

(signature)   2/29/12

Lesa Roe   Date
Payloads Control Board, Acting Manager and Chair
International Space Station Program
NASA

INTERNATIONAL SPACE STATION PROGRAM

STANDARD PAYLOAD INTEGRATION AGREEMENT
FOR SMALL PRESSURIZED PAYLOADS

CONCURRENCE

JANUARY 2002

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INTERNATIONAL SPACE STATION PROGRAM

**STANDARD PAYLOAD INTEGRATION AGREEMENT
FOR SMALL PRESSURIZED PAYLOADS**

LIST OF CHANGES

JANUARY 2002

All changes to paragraphs, tables, and figures in this document are shown below:

PCB	Entry Date	Change	Paragraph(s)
	March 2002	Baseline	All

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APPENDIX

TABLE

1.0 MANAGEMENT RESPONSIBILITIES AGREEMENT

1.1 INTRODUCTION

The Standard Payload Integration Agreement (SPIA) describes the general roles and responsibilities of the parties involved in the integration/deintegration, prelaunch/post-landing processing, transportation, and the on-orbit operation of a small pressurized payload. Additionally, it contains generic information pertaining to reviews, schedules, hardware commitments, and protocols required to manifest a payload.

A candidate for small payload status must meet all of the criteria presented in Section 1.2.1 of this document unless otherwise approved by the International Space Station (ISS) Program. If qualified to be processed as a small payload, the payload will use the small pressurized payload schedule template identified in SSP 57057, ISS Payload Integration Template, to progress from approval to flight.

For the purpose of this document, the Research Program Office (RPO), Payload Developer (PD), and Appropriate Office are treated as equivalent entities. The PD and the ISS Program Office will use this book as the requirements document for the development, implementation, and compliance of the technical integration requirements and processes for a small pressurized payload.

1.2 SCOPE

The SPIA defines management roles and responsibilities. It also defines requirements for flight and ground safety, operations, launch and landing site processing, resources, training, and small payloads schedules. These elements are necessary to accomplish the integration, launch, on-orbit operation, descent, and deintegration of the payload.

1.2.1 CRITERIA TO QUALIFY AS A SMALL PAYLOAD

United States or IP payloads that meet all criteria may apply for Small Payload Status. The following criteria are applicable to any prospective small payload:

A. Only pressurized payloads (those payloads that operate within the ISS pressurized volume) are eligible. Unpressurized payloads (those payloads that operate outside the ISS pressurized volume) are ineligible.

B. Self-contained hardware (including processing and storing of payload data) requiring only simple mechanical interface to ISS per SSP 50467, ISS Cargo Stowage Technical Manual: Pressurized Volume.

C. The payload deployment location will be at crew discretion and must be able to tolerate a relocation, if necessary. Payload's deployment requirements must be flexible and fit within the constraints of:

1. Protrusions: no more than 6 inches from rack face or other mating surface.

2. No more than 400 square inch surface area, with no single side exceeding 41 inches.

3. Mount with standard Rack Mounting Accessories. (For information, see JSC 28533, International Space Station (ISS) Catalog of IVA Government Furnished Equipment (GFE) Flight Crew Equipment (FCE).)

4. Capable of being returned to stowage in a maximum of 10 minutes, if necessary.

D. No ISS or shuttle resources (power, data, video uplink or downlink) required for payload hardware with the exception of crew time. This does not preclude on-orbit use of Government Furnished Equipment (GFE) photographic equipment.

E. Payload Stowage

1. Small Payloads must be passive or self-contained and can be transported up/down:

   a. in an Orbiter middeck locker or in a Cargo Transfer Bag Equivalent (CTBE) in the Middeck Crew Compartment. The usual stowage is in CTBEs.

   OR

   b. in the Multi-Purpose Logistics Module (MPLM) in Cargo Transfer Bags (CTBs).

   OR

   c. in a Spacehab locker or a Spacehab bag.

2. Total stowage volume not to exceed two Middeck Locker Equivalents (MLEs), for ascent, descent, and on-orbit. Payload-provided support equipment, logistics products, and trash, as well as the payload hardware, must be contained within the two MLE maximum.

3. No middeck locker replacement payloads. (No Orbiter resources can be provided.)

F. Total mass not to exceed 120 pounds. Support equipment and logistics, as well as the payload hardware, are included in the 120 pound maximum.

G. Training requirements not to exceed 2 hours of ground-based training (e.g., 1 hour familiarization and 1 hour nominal science).

H. On-orbit crew time will not exceed an average of 2 hours per week across the increment. Crew time includes destow, installation, activation, periodic status checks, deactivation, and restow.

I. Any on-orbit payload ground operating support location must be located at one of the established facilities and an existing voice loop must be used for any space-to-ground contact.

J. No requirement for crew operations (other than transfers) during transport (i.e., ascent, joint on-orbit, descent).

K. No requirement for rack services from EXpedite the PRocessing of Experiments to the Space Station (EXPRESS) or ISS facility racks (other than stowage).

L. No affiliation with or sponsorship by EXPRESS or other ISS facility racks (i.e., a small payload may not function as a subrack payload).

M. No flight rules.

N. No launch commit criteria requirements.

1.2.2 DOCUMENTATION

The primary documentation required to ensure proper integration of the payload consists of the SPIA and the supporting data.

1.2.3 APPROVAL AUTHORITY

The SPIA, Payload Integration Agreement (PIA), supporting data, and associated changes are to be approved jointly by the Space Station Payloads Office and the PD. The payload supporting data is controlled by Level III Control Boards and is submitted for development of flight products. The Small Payloads Integration Team will ensure that the PD's requirements are accurately defined, documented, and compatible with the ISS accommodations and that they are properly implemented.

1.2.4 CONFIGURATION MANAGEMENT

Configuration control for this SPIA commences upon the last required signature of this document. The ISS Program will maintain configuration control of this document in accordance with SSP 41170, Configuration Management Requirements.

1.2.5 INTELLECTUAL PROPERTY AND GOODS

Each Participant of this SPIA is obligated to transfer to the other any and all technical data and goods necessary to fulfill its responsibilities under this SPIA and is subject to the following:

A. Nothing within this SPIA requires or obligates either Participant to transfer proprietary technical data and goods contrary to national laws, statutes, or regulations relating to export controls or to the control of classified data.

B. All payload data requested will be used exclusively for the purpose of assigning payload resources, accommodations, and services as well as assessing compatibility for integration of the payload into the ISS.

C. In the event there is a transfer of any technical data and goods that are protected for export control purposes, the furnishing Participant will adequately mark with a notice, or otherwise specifically identify, all affected technical data and goods. This notice or identification will indicate that affected technical data and goods will be used by the receiving Participant and its contractors and subcontractors only for the purposes of fulfilling the receiving Participant's responsibilities under this SPIA. The notice of identification will also provide that affected technical data will not be disclosed and such technical data and goods will not be further distributed to any entity without prior written permission of the originating Participant. The Participants agree to abide by the terms of the notice or identification and to protect all affected technical data and goods. National Aeronautics and Space Administration (NASA), International Partners (IPs), and Participants will follow the technology transfer guidelines in the Intergovernmental Agreement. NASA will follow the export classification and marking process described in the NASA Export Control Program.

D. The Participants are under no obligation to protect any unmarked proprietary technical data, documentation, or other unidentified protected goods.

E. Information relevant to integration, operations, and safety, as well as documentation development (including detailed design data but excluding manufacturing, processing data, and associated software), will be exchanged without restriction as to use or disclosure. In the event of transfer of proprietary technical data for which protection is to be maintained, such technical data will be adequately marked with a notice indicating that this data will be used and disclosed by the receiving Participant and its contractors and subcontractors only for the purpose of fulfilling the receiving Participant's responsibilities under this SPIA. Proprietary data will not be disclosed or further distributed to any other entity without prior written permission of the originating Participant. The receiving Participant agrees to abide by the terms of the notice and to protect any such marked technical data from unauthorized use and disclosure.

1.3 PRECEDENCE

In the event of inconsistency among payload integration documentation contained within the applicable documents, resolution will be achieved by observing the following order of precedence:

A. Safety documents

B. Payload Tactical Plan (resource allocations only)

C. Unique PIA

D. SPIA

E. Payload supporting data

F. Applicable documents other than A, B, C, D and E

1.4 PUBLIC INFORMATION

Distribution of information to the public pertaining to the payload may be made by each Participant of this SPIA for its own portion of the program on an increment- and flight-specific basis in accordance with the ISS Program NASA Public Affairs Office. Insofar as participation of the other Participant is involved, information may be released to the public after suitable consultation and agreement as to its content.

Certain categories of information regarding the payload, such as proprietary information collected from the crew, are not suitable for public dissemination. The ISS communications system is considered sufficiently secure to protect the downlink of sensitive material. Distribution of sensitive material following receipt by the ground via mail, fax, or electronic means shall be done using appropriate data privacy measures.

1.5 FINANCIAL ARRANGEMENTS

The cost of discharging their respective responsibilities under this SPIA will be sustained by each Participant involved, unless otherwise mutually agreed upon. Technical agreements contained within this SPIA will be subject to the availability of appropriated funds. Should either Participant encounter financing problems, that Participant will notify the other Participant in a timely manner.

1.6 COMPLIANCE WITH EXPORT CONTROLS

Each United States (U.S.) PD is obligated to comply with Public Law; SSP 50223, International Space Station Export Control Plan; and NPD 2190.1, NASA Export Control Program, and local export management requirements. The Export Control status of each payload and payload product shall be identified by the sponsoring organization at the start of the payload integration processes with the ISS. All PDs shall identify any and all hardware, software, or technical information that is subject to U.S. export controls. PDs shall be responsible for obtaining export classification per ISS Payloads Office issued direction (Letter OZ-01-00). Failure to obtain timely and complete export classifications for the payload may delay the integration process, and may result in the payload being de-manifested or manifested on later flights.

Non-U.S. PDs are expected to work with all U.S. Partners, subcontractors, or suppliers of U.S.-origin hardware or software for their project, and to identify all constituent payload items, if any, which have been exported from the United States under a U.S. government export license. The PDs shall notify the Payloads Office (Johnson Space Center (JSC)-OZ2) of all such export license numbers and items licensed thereunder.

2.0 DOCUMENTS

2.1 APPLICABLE DOCUMENTS

The following documents include specifications, models, standards, guidelines, handbooks, and other special publications. The current issue of the following documents is identified in the Program Automated Library System (PALS) (http://iss-www.jsc.nasa.gov/ss/issapt/pals) or Payload Integrated Library System (PILS) (http://sspweb.jsc.nasa.gov/pils/payload.cfm). The documents listed in this paragraph are applicable to the extent specified herein. Inclusion of applicable documents herein does not in any way supersede the order of precedence identified in Paragraph 1.3 of this document.

SSP 41170	Configuration Management Requirements
SSP 50200-01	Station Program Implementation Plan, Volume 1: Station Program Management Plan
SSP 50223	International Space Station Export Control Plan
SSP 50254	Operations Nomenclature
SSP 50260	International Space Station Medical Operations Requirements Documents (ISS MORD)
SSP 50305 Volume I	POIC to Generic User Interface Definition Document
SSP 50313	Display and Graphics Commonality Standard
SSP 50313, Appendix H	Payload Display Design Standards and Guidelines
SSP 50467	ISS Cargo Stowage Technical Manual: Pressurized Volume
SSP 52000-PDS	Payload Data Sets Blank Book
SSP 57000	Pressurized Payloads Interface Requirements Document
SSP 57057	ISS Payload Integration Template
SSP 57064 **<TBD 2-1>**	Payload Integration Agreement Blank Book for Small Pressurized Payloads
SSP 58304A	Ground Support Personnel Training and Certification Plan
SSP 58309	Payload Training Implementation Plan

SSP 58312A	Payload Operations Integration Center Payload Operations Handbook Volume 2: Increment Operations
SSP 58313	NASA Payload Regulations
SSP 58700	U.S. Payload Operations Data File Management Plan
NSTS 07700 Volume XIV Appendix 9	Space Shuttle System Payload Accommodations, System Description and Design Data - Intravehicular Activities
NSTS/ISS 13830	Payload Safety Review and Data Submittal Requirements For Payloads Using the: - Space Shuttle - International Space Station
NSTS 1700.7B	Safety Policy and Requirements for Payloads Using the Space Transportation System
NSTS 1700.7B ISS Addendum	Safety Policy and Requirements for Payloads Using the International Space Station
NSTS/ISS 18798	Interpretations of NSTS/ISS Payload Safety Requirements
NSTS 21000-IDD-MDK	Middeck Interface Definition Document
JSC 20483	JSC Institutional Review Board Guidelines for Investigators Proposing Human Research for Space Flight and Related Investigations
JSC 28533	International Space Station (ISS) Catalog of IVA Government Furnished Equipment (GFE) Flight Crew Equipment (FCE)
KHB 1700.7	Space Shuttle Payload Ground Safety Handbook
MDC 91W5023K	SPACEHAB Experiment Interface Definition Document (IDD)
NPD 2190.1	NASA Export Control Program

2.2 REFERENCE DOCUMENTS

The following documents contain supplemental information to guide the user in the application of this document. These reference documents may or may not be specifically cited within the text of this document.

SSP 30223	Problem Reporting and Corrective Action for the Space Station Program
SSP 30695	Acceptance Data Package Requirements Specification
SSP 50200-02	Station Program Implementation Plan, Volume 2: Program Planning and Manifesting
SSP 50200-03	Station Program Implementation Plan, Volume 3: Cargo Analytical Integration
SSP 50200-04	Station Program Implementation Plan, Volume 4: Payload Engineering Integration
SSP 50200-05 Part 1	Station Program Implementation Plan, Volume 5: Logistics and Maintenance, Part 1: Maintenance
SSP 50200-05 Part 2	Station Program Implementation Plan, Volume 5: Logistics and Maintenance Part 2: Logistics
SSP 50200-06	Station Program Implementation Plan, Volume 6: Cargo Physical Processing
SSP 50200-07	Station Program Implementation Plan, Volume 7: Training
SSP 50200-08	Station Program Implementation Plan, Volume 8: Increment Execution Preparation
SSP 50200-09	Station Program Implementation Plan, Volume 9: Real-Time Operations
SSP 50200-10	Station Program Implementation Plan, Volume 10: Sustaining Engineering
SSP 50253	Operations Data File Standards
SSP 50431	Space Station Program Requirements for Payloads

SSP 50477	Joint Crew Provisioning Catalog
SSP 50486	Preflight Imagery Requirements for NASA-Provided ISS Government Furnished Equipment
SSP 50502	International Space Station Hardware Preflight Imagery Requirements
SSP 50503	International Space Station Onboard Training Media Requirements
SSP 50521 **<TBD 2-2>**	Return, Processing, Distribution and Archiving of Imagery Products from the International Space Station
SSP 52000-PAH-KSC	International Space Station Payload Accommodations Handbook Payload Processing Accommodations at KSC
SSP 5410X-XX	Increment Definition and Requirements Document for Planning Period X, Annex 1: Station Manifest (Series of Annexes of Flight-Specific Station Manifests)
SSP 57020	Pressurized Payload Accommodation Handbook
SSP 58026-01	Generic Payload Simulator Requirements Document, Volume I
SSP 58200	Multilateral Payload Regulations
NSTS 12820 Volume A	Space Shuttle Operational Flight Rules - Volume A
NSTS 12820 Volume B	ISS Generic Operational Flight Rules
NSTS 12820 Volume C	Joint Shuttle/ISS Operational Flight Rules
NSTS 14046	Payload Verification Requirements
NSTS 21000-IDD-ISS	International Space Station Interface Definition Document

NSTS 21000-SIP-MDK	Shuttle/Payload Standard Integration Plan for Middeck-Type Payload
JSC 27472	Requirements for Submission of Data Needed for Toxicological Assessment of Chemicals and Biologicals to be Flown on Manned Spacecraft
KHB 1710.2	Kennedy Space Center Safety Practices Handbook

3.0 ROLES AND RESPONSIBILITIES

The responsibility for ensuring compliance with the requirements specified within SSP 57064, Payload Integration Agreement Blank Book for Small Pressurized Payloads **<TBD 2-1>**, is vested with the ISS Program and the PD. The ISS Program, represented by the Payload Integration Manager (PIM) and the Small Payloads Integration Team, is responsible for the integration, operation, and transportation to and from the ISS as specified in this SPIA. The PD organization is responsible for the development and support of the payload. The ISS Program will and the PD shall staff pertinent integration activities, as identified within this SPIA and in accordance with the templates contained in SSP 57057. By signing the payload-unique PIA created from SSP 57064 **<TBD 2-1>**, all parties indicate their intent to comply with the roles and responsibilities specified therein.

4.0 ISS FLIGHT AND GROUND SAFETY REQUIREMENTS

The PD is responsible for ensuring that the payload and its Ground Support Equipment (GSE) are safe. Payload Flight and Ground Safety reviews must be completed 30 days prior to payload and GSE delivery to Kennedy Space Center (KSC). All PD-provided hardware and GSE shall be designed and operated to comply with the requirements of NSTS 1700.7B, Safety Policy and Requirements for Payloads Using the Space Transportation System; NSTS 1700.7B ISS Addendum, Safety Policy and Requirements for Payloads Using the International Space Station; and KHB 1700.7, Space Shuttle Payload Ground Safety Handbook.

Safety reviews will be held in accordance with NSTS/ISS 13830, Payload Safety Review and Data Submittal Requirements for Payloads Using the Space Shuttle, International Space Station. These safety requirements are supplemented by the interpretations and clarifications contained within NSTS/ISS 18798, Interpretations of NSTS/ISS Payload Safety Requirements. The payload shall meet these requirements at the SSP launch/landing sites and during flight operations, on-orbit operations, and ferry flights.

4.1 HAZARDOUS MATERIALS

4.1.1 HAZARDOUS MATERIALS SUMMARY

The PD shall provide full disclosure of the contents (including flammability, Measure of Acidity (pH), toxicity) of all substances including proprietary material used in or produced by the payload. The PD shall submit a materials list of all samples to the NASA/JSC Toxicology Group in accordance with NSTS/ISS 13830 and JSC 27472, Requirements for Submission of Data Needed for Toxicological Assessment of Chemicals and Biologicals to be Flown on Manned Spacecraft, for approval. The PD will verify that (1) materials planned to be loaded are listed on the approved Payload Test Material/Chemical Data Verification-1 (V-1) Hazardous Materials Summary Table (HMST); and (2) the PD's as-loaded materials list complies with the As-Loaded Test-Material/Chemical Verification Form (V-2) HMST. After final HMST approval, only deletions and/or reductions in concentration of the hazardous materials are allowed. The payload must also comply with the toxic labeling standards in NSTS 07700, Volume XIV, Appendix 9, Space Shuttle System Payload Accommodation, System Description and Design Data - Intravehicular Activities.

4.1.2 MATERIAL SAFETY DATA SHEETS

The PD shall provide Material Safety Data Sheets (MSDSs) for materials that could pose a hazard to ground personnel in accordance with KHB 1700.7.

4.1.3 PROCESS WASTE QUESTIONNAIRES

The PD shall provide Process Waste Questionnaires (PWQs) for any waste disposal at KSC. A PWQ form will be given to the PD by KSC Safety upon request.

4.2 BIOMEDICAL INVESTIGATIONS

JSC 20483, JSC Institutional Review Board Guidelines for Investigators Proposing Human Research for Space Flight and Related Investigations, establishes policies to be implemented by NASA-JSC Institutional Review Board (IRB) regarding human research protocol. The Partner's IRB and Human Research Multilateral Review Board (HRMRB) will review and approve any protocols in which the payload uses preflight, in-flight, on-orbit, or post-flight scientific or medical protocols on human subjects on ISS.

A. The PD shall prepare and support an integrated hazard assessment of the entire payload and its interfaces for each flight increment and/or resupply mission. The flight surgeon in the Mission Control Center - Houston (MCC-H) Flight Control Room (FCR) is the real-time authority regarding flight crew health in-flight. The ISS Program, represented by the MCC-H FCR surgeon, will perform real-time monitoring of biomedical items requiring physician monitoring on the ground with respect to flight crew health and safety. The requirement for crewmember consent and the restrictions on the use of crewmembers as subjects are described in SSP 50260, International Space Station Medical Operations Requirements Documents (ISS MORD).

B. The PD, with approval from the HRMRB, shall determine the data monitoring requirements for particular biomedical experiments being performed. For some biomedical experiments (intense exercise, lower body negative pressure, etc.), downlinked electrocardiogram data will be required by the FCR surgeon.

In support of this review, the PD shall provide the Payload Operations Director (POD) and Payload Safety Review Panel (PSRP) with any additional safety-related data that may impact flight operations decisions.

4.3 OPERATIONAL SAFETY

In support of flight operations and increment preparation, the PD shall provide the Marshall Space Flight Center (MSFC) POD and PSRP any additional safety-related data that may impact flight operations decisions. If procedures are used as operational safety controls, the MSFC POD must also be given a copy of the procedures.

5.0 VERIFICATION REQUIREMENTS

Small payloads must provide verification for transport and ISS on-orbit operations as specified below.

5.1 SMALL PAYLOAD MULTI-PURPOSE LOGISTICS MODULE TRANSPORT AND ON-ORBIT OPERATIONS VERIFICATION REQUIREMENTS

All payloads to be transported in the MPLM and/or operated in the United States On-Orbit Segment (USOS) pressurized module must meet the requirements of SSP 57000, Pressurized Payloads Interface Requirements Document. Based on the definition of a small payload provided in Section 1.2.1 of SSP 57063, a subset of verification requirements that may be applicable to this class of payload has been determined. The Engineering Integration Lead will support the development of the verification data.

This subset is contained in SSP 57064 **<TBD 2-1>**, Section 5.1, Table 5.1-1, Verification Requirements Applicable to Small Payloads. The PD must assess each requirement listed in this table and indicate the applicability or non-applicability to its hardware. All requirements listed in Table 5.1-1 as applicable to the payload must include the verification method to be used (test, analysis, or inspection), the required data (certificate of compliance, data certification, test report), and the negotiated date of submittal to OZ3/Payload Engineering and Integration. Furthermore, any SSP 57000 requirements not listed in Table 5.1-1 that apply to the payload's unique hardware must be added to this table.

Verification data must be submitted to OZ3/Payload Engineering and Integration per the scheduled data submittal requirements listed in Table 5.1-1 of the payload-unique PIA.

5.2 ORBITER MIDDECK TRANSPORTED PAYLOADS

The PD shall provide data in accordance with the negotiated payload-unique integration schedule. Delivery of required data to the ISS Program as specified in NSTS 21000-IDD-MDK, Middeck Interface Definition Document, shall be insured by the PD.

Basic design loads and requirements for Orbiter Middeck transported payloads are documented in NSTS 21000-IDD-MDK. For battery powered Orbiter Middeck payloads, the PD shall provide electrical and thermal, Electromagnetic Compatibility (EMC)/Electromagnetic Interference (EMI) and acoustic data to the ISS Program in accordance with this document.

5.3 SPACEHAB TRANSPORTED PAYLOADS

The PD shall provide data in accordance with the negotiated payload-unique integration schedule. Delivery of required data to the SPACEHAB program as specified in MDC 91W5023K, SPACEHAB Experiment Interface Definition Document (IDD), shall be insured by the PD.

Basic design loads and requirements for SPACEHAB transported payloads are documented in MDC 91W5023K. For battery-powered SPACEHAB payloads, the PD shall provide electrical and thermal, EMC/EMI and acoustic data to the ISS Program in accordance with MDC 91W5023K.

6.0 OPERATIONS REQUIREMENTS

Operational requirements for payloads are planning, training, operating procedures and reference data, ground data services, and payload verification. Real-time, the PD shall operate the payload in accordance with the Payload Operations Integration Center policies and procedures established by SSP 58313, NASA Payload Regulations, and SSP 58312A, Payload Operations Integration Center Payload Operations Handbook Volume 2: Increment Operations. Specific payload information is to be provided in the applicable sections of the payload-unique PIA document that is created using SSP 57064 **<TBD 2-1>**, as a guide. Although assistance is provided to the PD by the Program Office Small Payloads Integration Team, the PD maintains overall responsibility for the review and approval of payload-specific data.

6.1 PAYLOAD PLANNING DATA SET

Payload planning requirements are collected to detail payload-specific planning requirements for ascent/descent, transfer operations, and onboard crew time. The PD shall provide payload planning and resource requirements specifications to the Operations Integration Lead. The Operations Integration Lead will provide the requirements to the Payload Operations Integration Center (POIC) planners via the interim User Requirements Collection (iURC)/User Requirements Collection (URC) tool. Using the payload, systems, and program requirements and constraints, the ISS Program, represented by the POIC mission planners, will develop integrated payload plans. These plans will be integrated with the ISS systems plan. The POIC mission planners will provide the PD the integrated planning products, including the Payload On-orbit Operations Summary (PL OOS) via the Increment Operations Plan (IOP).

6.2 CREW TRAINING

To support payload crew training, the PD shall participate in the Training Strategy Team (TST) process as defined in SSP 58309, Payload Training Implementation Plan. The TST process is a series of Technical Interchange Meetings (TIMs) where the PD exchanges information with the Payload Display Review Team (PDRT), and the Payload Operations Data File (PODF) and Crew Training teams.

The TST process is utilized for the purpose of defining flight crew onboard and Increment-based training, ground operations cadre/support training, trainer/simulator requirements, and for introducing the requirements and schedule for crew displays and procedures.

During the TST process, the payload training objectives and the specific requirements for a trainer/simulator will be discussed. The PD is responsible for the development and delivery to JSC of a payload trainer/simulator that will support crew training on nominal, maintenance, safety-related, and limited malfunction procedures. Most small payloads will be required to provide a stand-alone trainer or other appropriate training equipment such as Computer Based Training (CBT).

Requirements discussed and agreed to during the TST process will be input into the Payload Data Library (PDL) by the Operations Integration Lead or a POIC simulation engineer as defined in Section 4 of SSP 52000-PDS, Payload Data Sets Blank Book.

6.3 PAYLOAD OPERATIONS

Payload Operations data provides the detailed flight operations requirements for the PD and ISS personnel, while the top-level operations requirements and allocations are identified in the payload-unique PIA. Payload Operations Data addresses the flight operations interfaces between the ISS Program Payload Operations Integration (POI) personnel and the PD operations team.

For small payloads, the payload flight operations information includes communication and coordination requirements and points of contact for the PD team. When applicable, detailed payload regulations and video/photo requirements will be collected. The PD shall submit their payload operations requirements data to the Operations Integration Lead to support the electronic submittal of requirements into the PDL. The ISS Program personnel will use this information to perform integration analysis and publish required documentation.

The PD shall support the development of flight operation regulations to include constraints, guidelines, and alternate plans for the safe and successful operation of their payload. Operational constraints or activities that may adversely impact the science or hardware of other payloads or a PD's own hardware, will be integrated by the POI personnel and documented in SSP 58313, NASA Payload Regulations.

6.4 PAYLOAD PROCEDURES AND DISPLAYS

Payload procedures and display data shall be delivered to the Operations Integration Lead for submittal to the appropriate Payload Operations Integration Function (POIF) personnel. Data required from the PD for Payload Procedures and Displays includes unique Operations Nomenclature, labeling, crew procedures and payload messaging, and crew displays. It is highly desirable for the PD to provide operations concepts and analyses of crew tasks for use by the PDRT. SSP 58700, U.S. Payload Operations Data File Management Plan, defines the policies, guidelines, protocol, roles and responsibilities of the ISS community members in the development, verification, validation, maintenance, and control of payload procedures and displays. Additional information on each of the following subsections is provided in SSP 58700.

6.4.1 OPERATIONS NOMENCLATURE

Payloads must comply with the Operations Nomenclature requirements specified in SSP 50254, Operations Nomenclature. To register payload-unique terms and acronyms, the PD shall submit operations nomenclature data to the Operations Integration Lead for input into Online Project Management System (OPMS).

6.4.2 LABELING

The PD is responsible for providing label content and engineering drawings to the Operations Integration Lead for submittal to the ISS Payload Label Approval Team (IPLAT) for review and approval. The goal is the standardization of payload labels to facilitate the crew's understanding, thereby increasing the amount of time spent on science.

6.4.3 CREW PROCEDURES AND PAYLOAD MESSAGING

The PD shall provide manual payload operating and reference data for their payload. These inputs should include, where applicable, activation and checkout, nominal, malfunction, corrective, quick response procedures, payload messages, and log files for both Earth-To-Orbit Vehicle (ETOV) and on-orbit operations. These procedures inputs shall be delivered to the Operations Integration Lead for submittal to the PODF via the OPMS and shall conform to the requirements specified in SSP 58700. Validation of all payload manual procedures is a PD responsibility. Verification of standards conformance, safety compliance, and implementation of operations hazards controls is a POIF responsibility. The Operations Integration Lead will support the PD to ensure that the necessary data is provided to the appropriate POIF personnel.

6.4.4 CREW DISPLAYS

The primary goal of crew display development is to produce highly usable displays. Usability is defined as the extent to which displays can be employed by crewmembers to implement specified functions with effectiveness, efficiency, and satisfaction in a specified context. The Displays and Procedures review process addresses combined displays and procedures usability (including procedure/display interoperability and cross-payload commonality). Either a Procedure or Integrated Usability test will be performed during the Displays and Procedures review. All payloads that incorporate a visual display (or multiple displays), and/or controls, whether they are Commercial-Off-The-Shelf (COTS), modified COTS or some combination, must pass a usability test at the completion of or during their development phase. Unique situations can be expected to occur with respect to deviations from the standard schedule template. In those cases, the PD should contact their PDRT point of contact for guidance.

The PD shall provide payload displays and operational reference information (e.g., non-dynamic displays, dynamic displays, and hardware diagrams) for operability and human computer interface assessments of the payload procedures and displays. The PD shall provide display inputs to the Operations Integration Lead for submittal to the PDRT via the OPMS and Payload Information Management System (PIMS) tools. PD display inputs shall comply with requirements specified in SSP 50313, Display and Graphics Commonality Standard, parent documents, plus SSP 50313, Appendix H, Payload Display Design Standards and Guidelines.

6.5 MISSION SUPPORT SERVICES

Any on-orbit payload ground operating support location must be located at MSFC United States Operations Center (USOC) or at one of the established NASA Telescience Support Center (TSC) facilities:

Ames Research Center (ARC)
Glenn Research Center (GRC) at Lewis Field
JSC
MSFC

Voice loops required to perform payload operations are available at each TSC. PD science loop assignments are made on a case-by-case basis by POIC Ground Data Services. To protect the POIC remote user interfaces, the PD shall adhere to the security requirements described in SSP 50305 Volume I, POIC to Generic User Interface Definition Document.

6.6 ISS ON-ORBIT DELAY/TERMINATION REQUIREMENTS, OPERATIONS CHANGE PROCESS

If the payload is delayed or terminated in real-time, any activities that are requested or required to be rescheduled will be submitted during the Operations Change Request (OCR) process. This process is documented in Section 1.6 of SSP 58312.

6.7 MISSION SUPPORT PERSONNEL/PAYLOAD OPERATIONS CONTACTS

The PD shall identify the payload's primary contacts for real-time payload operations. These individuals will be responsible for providing information on payload operations and making decisions on behalf of the payload. This contact should be available at all times (24 hours x 7 days) via voice loop, telephone, or pager.

6.8 GROUND SUPPORT PERSONNEL TRAINING

The PD shall assure compliance with the requirements defined in SSP 58304A, Ground Support Personnel Training and Certification Plan. Any Ground Support Personnel (GSP) who will require voice loop activation for Space-to-Ground communication during real-time payload operations must be identified and trained. It should be noted that no GSP would be provided access to voice loops without this training.

7.0 LAUNCH/LANDING SITE PROCESSING

KSC Launch Site Processing includes offline support, both physical integration and deintegration, and the checkout of payload interfaces to high-fidelity ISS and Orbiter simulated interfaces and actual Orbiter interfaces. Payload processing activities extend from prelaunch to post-landing phases, including late access to the Orbiter Middeck (MDK) prelaunch, and access to the Orbiter middeck post-landing. For reference, detailed information regarding KSC launch site processing is contained in SSP 52000-PAH-KSC, International Space Station Payload Accommodations Handbook Payload Processing Accommodations at KSC.

Any payload requirements levied on KSC that are Space Shuttle Program (SSP) Services or ISS Program-funded SSP Services will be negotiated and documented in the payload-unique PIA. The corresponding details of these requirements along with the ISS Standard Services are developed with the support of the Engineering Integration Lead. The Engineering Integration Lead will negotiate and provide the information to the KSC Technical Requirements and KSC Support Requirements Data Sets as documented in SSP 52000-PDS.

7.1 BASELINE DATA COLLECTION

The ISS Program will provide Baseline Data Collection (BDC) facilities at JSC, the primary launch and landing facility (KSC), and contingency landing site (Dryden Flight Research Center (DFRC)) for ISS crews. KSC (and DFRC) facility requirements are captured in SSP 52000-PDS, Section 7, KSC Support Requirements. BDC at JSC will be documented with assistance of the Small Payloads Integration Team. If BDC is applicable, a section is to be added (Section 10.0) in the unique PIA to specify requirements.

7.2 PRELAUNCH PROCESSING

7.2.1 MIDDECK PAYLOADS

Payload hardware transported to orbit in the Orbiter MDK will be nominally installed at the launch pad prior to the start of the mission launch countdown. Hardware stowed in a bag will be turned over to KSC at approximately Launch minus (L-)2 weeks. Hardware stowed in a locker will be turned over to KSC at approximately L-8 days. Payload requirements for the late installation of payload hardware and/or late payload servicing are SSP Services. These requirements can be defined in any of the following categories:

Category 1 - The payload requires late turnover/servicing within L-76 hours but prior to L-28 hours. The payload will be turned over from the PD to NASA KSC to allow installation in accordance with launch countdown and crew compartment stowage activities.

Category 2 - The payload requires late turnover/servicing (non-time specific) between L-28 hours and L-19.5 hours. The payload will be turned over from the PD to NASA KSC to allow installation in accordance with a mission-unique stowage schedule.

Category 3 - The payload requires late turnover/servicing within a specific time between L-28 hours and L-19.5 hours. The payload will be turned over from the PD to NASA KSC to allow installation in accordance with a mission-unique stowage schedule.

SSP Services Requirements will be defined and negotiated in Section 7 of the payload-unique PIA. In addition, information from this Section will be used to document the PD's justification of their requirements for payload late turnover within L-28 hours in terms of potential research/science loss. Payload turnovers to KSC must be completed by L-19.5 hours. Payload turnover times are based on completion of payload installation at L-17.5 hours. Late turnover requirements will not delay the vehicle launch countdown from proceeding to the primary mission planned launch window. Late turnover requirements may affect manifesting. Late turnover requirements will require coordination with the Launch Team/Launch Director during the launch countdown planning process. Late turnover conflicts may result in adjustments to turnover times. Mission-unique middeck processing schedules will be developed by KSC based upon documented middeck turnover requirements. Actual middeck turnover times will be scheduled based on these requirements. If payload hardware requiring middeck late turnover cannot be installed within its allocated time, then the SSP may decide not to install the payload or to fly the payload in a non-operational mode. For more information on Middeck Orbiter Integration reference NSTS 21000-SIP-MDK, Shuttle/Payload Standard Integration Plan for Middeck-Type Payloads.

7.2.2 MULTI-PURPOSE LOGISTICS MODULE PAYLOADS

ISS Program payloads transported to orbit in the MPLM carrier will be installed in the MPLM after payload verification and checkout are completed. At approximately L-2.5 months, there is an opportunity for time-critical payload installation, stowage, servicing, and closeouts in the Space Station Processing Facility (SSPF). The MPLM is then transported to the Pad for installation into the Orbiter.

After MPLM installation into the Orbiter, access to payloads mounted inside the MPLM will be available only for late installation of conditioned samples into the refrigerators and freezers as an SSP Service. Late access for stowage of refrigerator and freezer samples inside the MPLM is completed by L-88 hours and is followed by MPLM late access GSE removal.

SSP Services associated with the late installation of payload conditioned samples must be negotiated and documented in Section 7 of the payload-unique PIA.

7.3 LAUNCH DELAY/SCRUB TURNAROUND PROCESSING

Delays in the Shuttle launches occur due to numerous unforeseen and uncontrollable events. Services provided to the payload due to launch delays are considered SSP nonstandard services.

All MPLM Payloads shall support launch attempts for a minimum of 96 hours from the initial Time minus (T-)0 without requiring MPLM access. Any MPLM access requirements of less than 96 hours must be negotiated with the SSP.

Due to criticality of operations required to reestablish the proper launch configuration after a delay, the PD shall support delay scenarios as appropriate. For samples and/or hardware requiring access as a result of a delay, the ISS Program and the SSP will determine if servicing/changeout is possible under the actual conditions. If a replacement is agreed to, the PD must plan for providing the necessary replacement items, personnel, and equipment.

For short launch delays, such as 24 hours, the time available for experiment refurbishment may necessitate replacement of samples at the pad in lieu of returning the hardware to the PD. For MDK experiments that are only viable for the first planned launch attempt, the PD must have redundant hardware and/or biospecimens in order to facilitate an exchange at the pad.

SSP Services associated with contingencies such as Orbiter launch delays/scrub turnaround must be negotiated and documented in Section 6.5.2 of the payload-unique PIA.

7.4 POST-LANDING

7.4.1 NOMINAL POST-LANDING PROCESSING

If the End of Mission (EOM) landing is at the KSC Shuttle Landing Facility, time-critical MDK payload items (e.g., live specimens) are removed at the landing strip (SSP Service) prior to Orbiter tow. The Orbiter is then towed to the Orbiter Processing Facility (OPF), jacked and leveled, the remaining MDK payload items removed (within 4 days of landing), and final safing/deserving operations are completed. Conditioned samples are removed from the refrigerator/freezers in the MPLM approximately five days after landing. MPLM removal from the Orbiter is normally completed seven days after the Orbiter arrives at the OPF. The MPLM is then returned to the ISS Program for further payload deintegration.

If the EOM landing is at DFRC, time-critical MDK payload items (e.g., live specimens) are removed at the landing strip (SSP Service) prior to Orbiter tow. The Orbiter is then towed to the Mate/Demate Device and following jacking and leveling, the remaining MDK payload items are removed (within 4 days of landing) and final safing/deservicing operations are completed. At DFRC, access to conditioned samples in the MPLM will be at approximately Return plus (R+)four days. After all MDK and MPLM samples have

been removed, the Orbiter (with the MPLM aboard) is mated to the Shuttle Carrier Aircraft (SCA) for return to KSC. After arrival at KSC, the Orbiter is demated from the SCA and towed to the OPF for payload removal and final deservicing operations. MPLM removal from the Orbiter is normally completed seven days after the Orbiter arrives at the OPF. The MPLM is then returned to the ISS Program for further payload deintegration.

SSP Services associated with post-landing processing must be negotiated and documented in Section 9 of the unique PIA. Early access to the MPLM at KSC and DFRC for removal of conditioned samples is an SSP Service.

7.4.2 INTACT ABORT PROCESSING

Should an aborted flight land at KSC or at DFRC, the SSP will remove the MDK payloads using its best efforts. If an aborted flight lands at a site other than KSC or DFRC, the payloads stowed in the Orbiter MDK will be removed and returned by the SSP separately to the launch site for turnover to the PD.

If an aborted flight lands at a site other than KSC, all returned payload complement hardware in the MPLM will nominally remain onboard the Orbiter for ferry to the launch site via the SCA. However, because of non-primary landing site locations, weight, Center of Gravity (CG), safety considerations, or mission-unique requirements, portions or all of the MPLM may be removed from the Orbiter payload bay, deintegrated (if required), and transported in ISS Program-provided shipping containers by the ISS Program to the launch site.

The ISS Program and the PD are responsible for the performance of payload-unique operations (data removal, safing, preparations for transporting, etc.) and will provide the landing site personnel and GSE to conduct these operations. Within the transportation provisions for the SSP GSE and personnel, the SSP will provide, on a space-available basis, transportation of payload-unique GSE and personnel to and from the landing site.

7.4.3 EARLY END OF MISSION

An Early End of Mission (EEOM) occurs if a flight lands at KSC or DFRC before the planned EOM. In this case, the SSP shall remove and disposition the payload using its best efforts. If the payload requires EEOM support other than best effort, this support is an ISS Program-funded SSP Service. ISS Program-funded SSP services associated with an EEOM support must be negotiated and documented in Section 4.3 of the unique PIA.

8.0 SCHEDULE FOR DELIVERABLES

A generic ISS Program PIM schedule template was developed to ensure that small payload integration activities meet the ISS Program requirements for a standard mission preparation process. This template is defined in SSP 57057.

A payload-unique ISS Program PIM schedule will be developed. This schedule will be managed by the PIM in coordination with the PD and the ISS Program Integration team, and will be reviewed and updated monthly. Issues will be elevated to the Payload Mission Integration Team (PMIT) for resolution as required.

APPENDIX A

ACRONYMS AND ABBREVIATIONS

APPENDIX A - ACRONYMS AND ABBREVIATIONS

ARC   Ames Research Center

BDC   Baseline Data Collection

CBT   Computer Based Training
CG   Center of Gravity
CM   Configuration Management
COTS   Commercial-Off-The-Shelf
CTB   Cargo Transfer Bag
CTBE   Cargo Transfer Bag Equivalent

DFRC   Dryden Flight Research Center
DQA   Data Quality Assurance

EAR   Export Administration Regulations
EEOM   Early End of Mission
EMC   Electromagnetic Compatibility
EMI   Electromagnetic Interference
EOM   End of Mission
ETOV   Earth-To-Orbit Vehicle
EXPRESS   EXpedite the PRocessing of Experiments to the Space Station

FCE   Flight Crew Equipment
FCR   Flight Control Room

GFE   Government Furnished Equipment
GRC   Glenn Research Center
GSE   Ground Support Equipment
GSP   Ground Support Personnel

HMST   Hazardous Materials Summary Table
HRMRB   Human Research Multilateral Review Board

IDD   Interface Definition Document
IOP   Increment Operations Plan
IP   International Partner
IPLAT   ISS Payload Label Approval Team
IRB   Institutional Review Board
ISS   International Space Station
iURC   interim User Requirements Collection
IVA   Intravehicular Activity

JSC   Johnson Space Center

KSC   Kennedy Space Center

L-   Launch minus

MCC-H	Mission Control Center - Houston
MDK	Middeck
MLE	Middeck Locker Equivalent
MORD	Medical Operations Requirements Documents
MPLM	Multi-Purpose Logistics Module
MSDS	Material Safety Data Sheets
MSFC	Marshall Space Flight Center
NASA	National Aeronautics and Space Administration
OCR	Operations Change Request
OPF	Orbiter Processing Facility
OPMS	Online Project Management System
PALS	Program Automated Library System
PCB	Payloads Control Board
PD	Payload Developer
PDL	Payload Data Library
PDRT	Payload Display Review Team
pH	Measure of Acidity
PIA	Payload Integration Agreement
PILS	Payload Integrated Library System
PIM	Payload Integration Manager
PIMS	Payload Information Management System
PL OOS	Payload On-orbit Operations Summary
PMIT	Payload Mission Integration Team
POD	Payload Operations Director
PODF	Payload Operations Data File
POI	Payload Operations Integration
POIC	Payload Operations Integration Center
POIF	Payload Operations Integration Function
PSRP	Payload Safety Review Panel
PWQ	Process Waste Questionnaire
R+	Return plus
RPO	Research Program Office
SCA	Shuttle Carrier Aircraft
SPACEHAB	Space Habitat Module
SPIA	Standard Payload Integration Agreement
SSP	Space Shuttle Program
SSPF	Space Station Processing Facility
T-	Time minus
TBD	To Be Determined
TBR	To Be Resolved
TIM	Technical Interchange Meeting
TSC	Telescience Support Center

TST   Training Strategy Team

URC   User Requirements Collection
U.S.   United States
USOC   United States Operations Center
USOS   United States On-Orbit Segment

APPENDIX B

OPEN WORK

APPENDIX B - OPEN WORK

Table B-1 lists the specific To Be Determined (TBD) items in the document that are not yet known. The TBD is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBD item is numbered based on the section where the first occurrence of the item is located as the first digit and a consecutive number as the second digit (i.e., **<TBD 4-1>** is the first undetermined item assigned in Section 4 of the document). As each TBD is solved, the updated text is inserted in each place that the TBD appears in the document and the item is removed from this table. As new TBD items are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBDs will not be renumbered.

TABLE B-1 TO BE DETERMINED ITEMS

TBD	Section	Description
2-1	Foreword, 2.1, 3.0, 5.1, 6.0	Unpublished document.
2-2	2.2	Unpublished document.

Table B-2 lists the specific To Be Resolved (TBR) issues in the document that are not yet known. The TBR is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBR issue is numbered based on the section where the first occurrence of the issue is located as the first digit and a consecutive number as the second digit (i.e., **<TBR 4-1>** is the first unresolved issue assigned in Section 4 of the document). As each TBR is resolved, the updated text is inserted in each place that the TBR appears in the document and the issue is removed from this table. As new TBR issues are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBRs will not be renumbered.

TABLE B-2 TO BE RESOLVED ISSUES

TBR	Section	Description